

## LOW WORK FUNCTION MATERIAL

## CROSS-REFERENCE TO RELATED APPLICATIONS

5       The present application is a continuation-in-part of United States Patent  
Application Serial No. 10/005,989 filed December 5, 2001, <sup>new Patent No. 6,885,622</sup> which claims priority to  
United States Provisional Patent Application Serial No. 60/254,374 filed December 8,  
2000.

## TECHNICAL FIELD

10       The present invention relates in general to field emission devices, and in  
particular to field emission devices comprising carbon nanotubes.

## BACKGROUND INFORMATION

15       Carbon films, including carbon nanotube (CNT) materials, are being  
developed for cold cathode applications. These applications include field emission  
displays, x-ray tubes, microwave devices, CRTs, satellite thrusters, or any  
applications requiring a source of electrons. There are many types of carbon films  
that are being considered. The emission mechanism believed to be responsible for the  
emission of electrons from these carbon films is the Fowler-Nordheim theory; this is  
20       especially true for the carbon films that are conducting. Included in this emission  
mechanism is an electrical barrier at the surface of the conductor that prevents  
electrons from exiting the metal. However, if a strong field is applied, this barrier is  
lowered or made thin such that electrons can now "tunnel" through the barrier to  
create a finite emission current. The height of this barrier is partially determined by